ART. XI – *Further structural analysis at Piel Castle, 1987-94*

By R. NEWMAN

IN the early 1980s, English Heritage began an assessment of the properties in its care in the north-west of England. This highlighted the need for consolidation and repair at a number, foremost amongst which was the relatively little known Piel Castle. Once a holding of the Abbots of Furness Abbey, this stands on an island (now known as Piel Island) at the mouth of Barrow Harbour. It was granted its licence to crenellate in 1327 (*Cal. Pat. Rolls 1327-1330,* 169, quoted in Curwen 1910, 272). In advance of consolidation works, it was felt that an archaeological survey of the fabric and limited excavations should be undertaken, to create a record of the standing structures (onto which consolidation and repairs could be plotted), to establish a basic chronology of the site, and to assess the potential for fragile archaeological deposits below ground which may have been at risk of damage from the consolidation work. English Heritage commissioned the Lancaster University Archaeological Unit (then the Cumbria and Lancashire Archaeological Unit) to undertake this work, in the autumn of 1983 and 1984. The results of this were published in these *Transactions* (Newman 1987), supplementing Curwen's earlier history of the monument (1910).

In 1987, following repair of the sea defences at the south-eastern corner of the island by Barrow District Council, English Heritage began a five year programme of consolidation and repairs to the monument. This was undertaken by John Laing Construction Limited, under a consultant architect. English Heritage provided a clerk of works, who produced the "as built" record, to supplement the original fabric survey, and the Lancaster University Archaeological Unit (LUAU) was again commissioned to provide the archaeological consultancy. The consultant was to record additional information which became available during the consolidation programme and to advise on individual elements of the monument in terms of both consolidation and repair, including, where necessary, minor reconstruction.

Subsequently, in 1993, LUAU was also commissioned by English Heritage to record the masonry which had collapsed on to the beach, and which consisted primarily of elements of the southern outer curtain wall and the eastern wall of the keep. This allowed the completion of analysis of all surviving elements of the monument as well as recording in some detail those elements most at risk from erosion.

Methodology

The programme of consolidation and repair was designed to retard the slow erosion of the fabric, to stabilise the monument for the next half century, and to deter vandalism. During this programme regular monthly monitoring meetings were held, at which updates could be made to the record of the fabric as work progressed. Consolidation work concentrated on the keep and inner bailey, with only essential

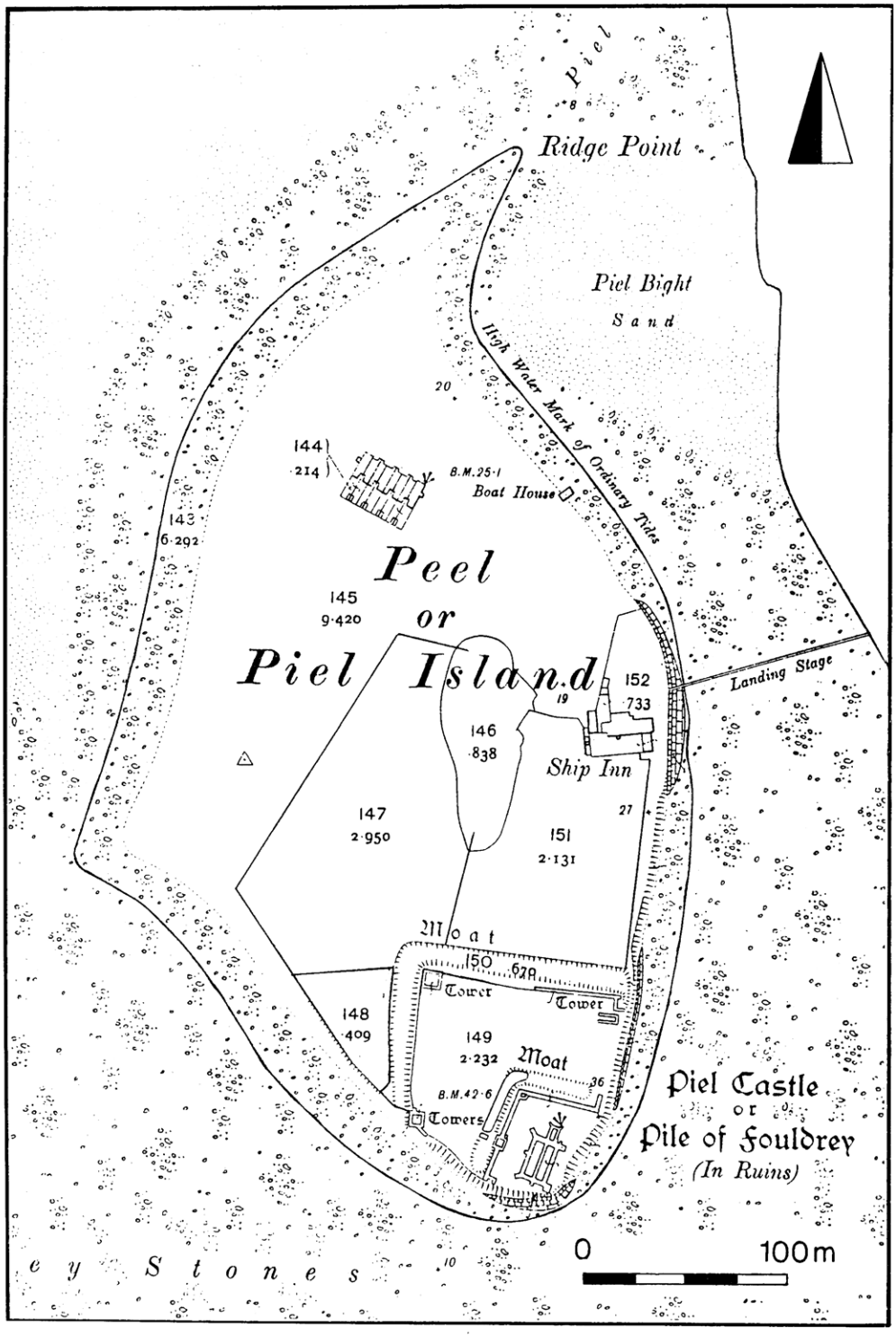

FIG. 1. Ordnance Survey (1913) 1:25 inch plan of Piel Island.

repairs being made to the outer bailey, primarily to the south-western and north-eastern towers. Some further work has recently been undertaken in the outer bailey. This consolidation mainly entailed removal of vegetation, and the raking out and repointing of all joints. In all cases, care was taken to match new pointing to the original mortar as closely as possible. In areas of red sandstone ashlar, the state of the stone was assessed; where possible it was left untouched, but in areas of bad decay individual stones were either repaired or replaced. Only in those areas where erosion or robbing had created holes which might exacerbate the rate of erosion was any reconstruction attempted. In these cases, careful comparison with surrounding masonry, and reference to other elements of the monument, usually allowed an accurate reconstruction. In several cases, rainwater spouts were also reconstructed. No such spout had survived in the monument in anything but a ruinous form; nevertheless, spouts were considered necessary to throw water off the walls, so preventing erosion of the pointing. The required spouts were reconstructed without detail of any kind and of sufficient length to serve their purpose, but no more. Dates were added to the fabric in all cases of reconstruction.

The consolidation of the monument required its almost complete scaffolding at some time during the programme. The original fabric survey of 1984 had been undertaken from ground level, which gave the benefit of an overview of each elevation without interruption. It meant however, that areas inaccessible from the ground, particularly upper windows, stairwells, and intramural passages, were not examined in detail. These were now recorded as they became available. Where appropriate, written descriptions and photography were supplemented by drawings of detail, particularly of surviving window tracery.

Some elements had been inaccessible in 1984 due to the amount of vegetation on the monument; in particular, little had been recorded of the wall walks on the inner or outer curtain walls, since they were covered in turf, and removal of this might have jeopardised the survival of any original surface beneath. All vegetation was cleared during the consolidation programme, and measures taken to record and preserve original features. In cases such as these, a detailed photographic record was particularly important.

On a number of occasions, elements of the monument proved to be unsound structurally and therefore more radical measures were required to prevent collapse. Both the outer south-western and, more particularly, the outer north-eastern towers were in need of underpinning at those points close to the erosion edge of the cliff. In the latter case, a buttress was constructed to underpin the curtain forming the north wall of the tower, to halt the outward movement of that wall. In these cases, where intervention into the ground as well as the fabric was required, a constant watching brief was maintained. Any information relating to the construction of the monument was recorded, by means of written records, scale drawings and photography.

The collapsed masonry on the beach was recorded by means of annotated drawings at a scale of 1:50 (in keeping with the elevations of the original fabric survey). These followed the conventions formulated for the 1984 survey: stone by stone drawings of all red sandstone, but simple outlines of the main body of each elevation, since it was felt that little benefit would be gained from recording details of stones which had been randomly selected and only roughly shaped during the original construction of the monument. Areas of erosion were noted, as was

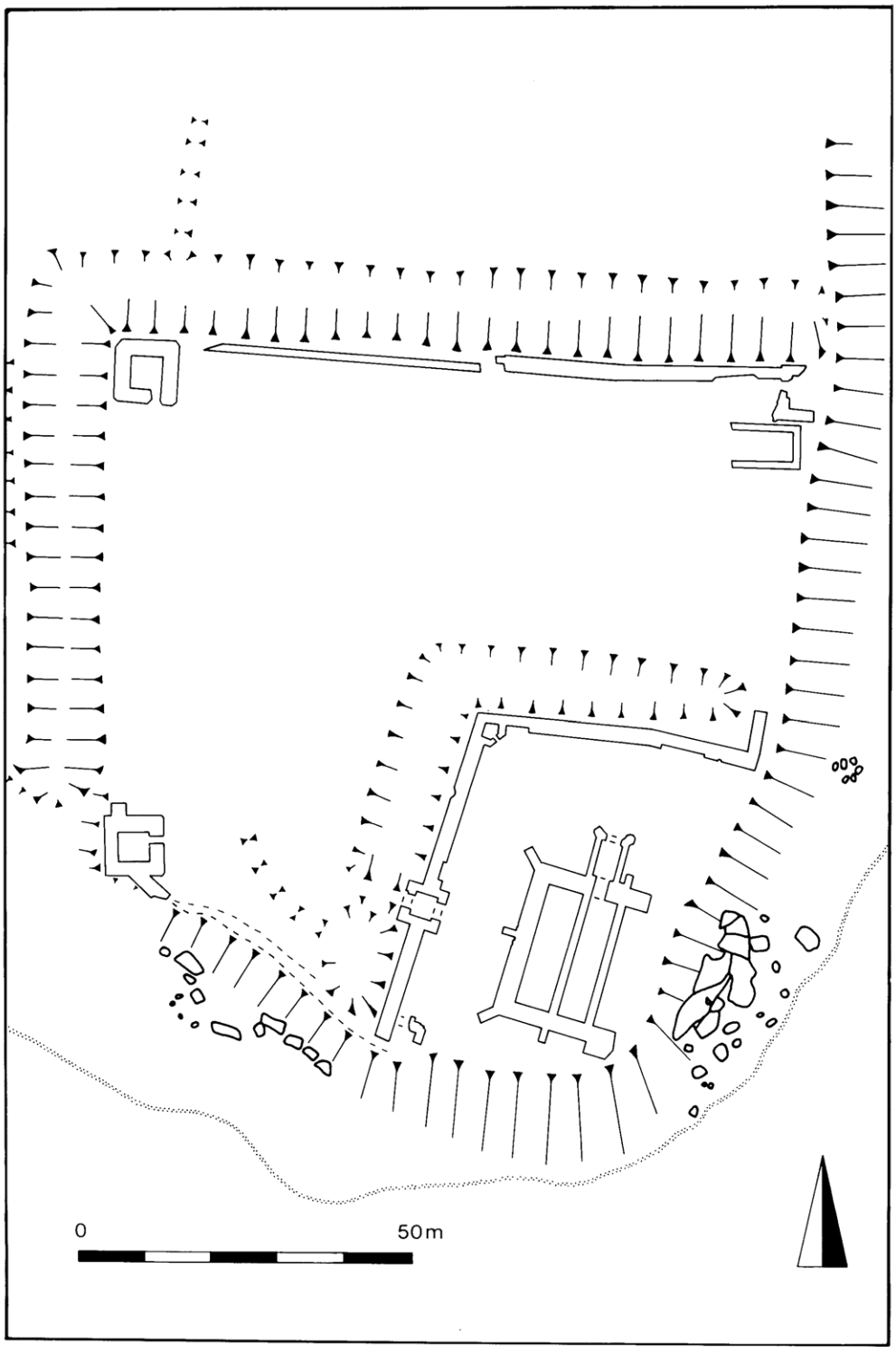

FIG. 2. Plan of the castle.

vegetation, and any particular architectural features, such as window openings, flues/fireplaces, garderobes, plinths, or putlock holes. A detailed photographic cover also formed part of this record. Since this masonry did not survive in its original position, noting the orientation of each fragment was particularly important and, in some cases, has allowed at least partial reconstruction to be attempted.

The archive resulting from this project has been collated and will be deposited in the Royal Commission on the Historic Monuments (England) (RCHME) store in Helmsley, North Yorkshire.

Results

During the programme of consolidation and repair, a number of observations were made which supplement the author's previous description of the standing fabric.

The Outer Bailey

A path now leads from the Ship Inn, below the standing remains of the outer north-eastern tower into the Outer Bailey, in effect over a causeway across the outer moat. During scaffolding for the emergency work on this tower, a carefully laid and coursed stone revetment was identified on the landward side of the causeway, clearly indicating that the moat had been deliberately terminated below the tower and that the apparent causeway was a genuine feature. This adds weight to the hypothesis that the north-eastern tower formed part of the main gate into the Outer Bailey.

This hypothesis is not without problems, however, for scaffolded access to the first floor of the tower allowed the confirmation of the existence of a garderobe in the south wall of the structure, the small projection of masonry over the north-east corner of the "Chapel" clearly forming part of the chute, from which the customary red sandstone facing has presumably been robbed. The position of this garderobe lends weight to the suggestion that the "Chapel" is a later structure, since otherwise effluent would have cascaded against the building. It remains somewhat puzzling, however, why this garderobe should be located on the inner side of the tower, rather than depositing waste directly into the moat. It seems unlikely that a garderobe would be placed close to the main entrance to the castle, even though no convincing alternative position for a gateway can be advanced.

Underpinning of the curtain wall which formed the north wall of this tower confirmed the supposition of the 1983 excavations that the foundations did indeed step downwards at this point, presumably reflecting an abrupt drop in height of the island as a whole. This rapid change in level causes some problems when considering the logic of the interpretation of a gate in this place, although erosion has removed the evidence which would confirm or deny this hypothesis.

The outer south-western tower was also served by a garderobe at first-floor level, in an intramural passage at the north-western corner of the structure. It was approached through a somewhat complicated arrangement of two doorways, since the entrance also led to a door on to the western curtain wall walk. Parts of a seat of red sandstone survived, with a chute to ground level, indicating that waste had been

deposited beyond the structure, presumably into the moat, although the precise arrangement remains uncertain, as the moat is no longer present at this point.

An area of erosion at the south-western corner of the tower, which had previously been roughly repaired with breeze blocks, has been rebuilt during this programme, using local materials. The wall tops were also stabilised, which gave an opportunity for more detailed consideration than had been possible in the original fabric survey. The top of the tower was decayed although parts of a wall walk were visible, particularly in the south-western corner, where slight traces of parging survived. The line of the stairs from the southern curtain entered at a slant from the south-east, protected by a raised parapet; it was not clear whether ladders had given access from the interior of the tower, although the tower provided the only link between the south (at roof level) and west (at first floor level) curtain walls. A horizontal groove some 100-200 mm wide was visible around the whole extent of the surviving parapet at the top of the tower, the purpose of which remains uncertain, although no trace of a roof line as such was identified. Close examination of the east interior wall of the tower allowed the identification of patches of parging surviving above the main load-bearing sockets, marking the finishing at the edge of presumably a timber floor.

The Inner Bailey

The gatehouse to the Inner Bailey was subject to a relatively large amount of repair. The foundations on the northern side of the outer gate-arch proved to be insecure, and these were underpinned. Much of the red sandstone forming this outer gate had decayed, and the majority of the centre and north side of the arch was replaced in 1987. Similarly, the north-western side of the internal arch was largely replaced, as was the keystone. A stone revetted bank was identified beneath the modern causeway, clearly once serving as the bed for the drawbridge, when it was down. No other metalled surface leading to the gate was exposed.

It is likely that the doorway in the south-western angle of the first floor of the gatehouse led to a garderobe overhanging the moat; insufficient evidence survives to confirm this supposition. This potential garderobe was situated next to the fireplace warming what was obviously the main guard-chamber of the Inner Bailey. The flue, lined with red sandstone, as also seen in the keep, led through the wall to the top of the structure, where it was slanted through the parapet, the hot air being allowed to escape through a small hole, surrounded by four blocks of red sandstone. This somewhat peculiar arrangement was presumably necessitated by the need to have access to the wall top immediately above the portcullis, which would have been made difficult if the hot air was allowed to escape directly upwards. The arrangement had been masked, presumably during the restoration works by the Duke of Buccleuch in the 1870s. The upper part of the portcullis slot was seen to be corbelled, apparently once faced on the inner side with red sandstone. This had been masked by the relatively modern concrete support around the wall top.

An important discovery during the consolidation programme was of a particularly fine stretch of the surviving medieval inner curtain wall walk to the north of the gatehouse, protected by vegetation and humus. This surface comprised small cobbles set in mortar, covered by a thin skim of very fine mortar, parged up the

parapet to create a water-tight lip. This form of construction is identical to that seen forming the inner threshold to the gatehouse when this was excavated in 1983.

The Keep

Further evidence for alterations to the gatehouse to the keep was gained during the consolidation programme. During the original fabric survey the entrance to an intramural passage was identified, presumably leading to intramural stairs to the wall walk around the structure. When this area was scaffolded this passage proved to have been blocked in antiquity, although the entrance onto the wall walk remained open.

Consolidation work concentrated on the keep, particularly those exterior walls most subject to eroding winds. Here, much of the red sandstone ashlar forming the architectural detail was replaced, including some which had obviously been the work of the Duke of Buccleuch, but which had decayed over its 115 years in the monument. Much of the red sandstone forming the external wall to the intramural stairs in the west keep had decayed or been robbed, leaving a large hole, through which it was possible to gain access to the interior. This was rebuilt to prevent unauthorised entry, and also to protect this wall from further erosion. Some speculation was required in this rebuilding as there was evidence to suggest that the stairs had been lit by at least one and probably two windows within the decayed section. It was decided that these should be rebuilt, using the evidence available, matching those which had survived elsewhere in the keep.

The scaffolding of the keep allowed detailed investigation of the large windows lighting the first, and especially the second, floors, the latter having remained open throughout the life of the castle. In particular, arrangements for glazing and shuttering could be examined for the first time. In almost every case the scars left by glazing bars were identified, which accords well with the reference to window glass from the monument existing in the 1870s (CRO Barrow, BD/BUC Box 3, letters). Traces of a groove for the glazing were visible some 160 mm behind the external chamfer, particularly in the southern elevation of the south-eastern tower, and the pivot point and rebate for shutters were also recognised some 130 mm behind the inner chamfer. It is clear that shutters covered at least the main rectangular lights, although it is likely that the tracery was never covered. This would suggest that domestic accommodation was relatively well draught-proofed.

Scaffolding also allowed the examination of the structure of the floor levels. Wall plates along the long east and west walls were seen to have been deeply embedded in the narrow north and south walls of the west keep compartment, clearly acting as extra support for the massive floor joists.

The interiors of intramural passages in the keep could be recorded for the first time; these particularly pertain to garderobes and to stairwells. The intramural passages in the south-west corners of the central and western keep compartments both led to garderobes, both at second floor level. In each case, the garderobe surround remains, formed of flat slabs of red sandstone. The ceiling of the garderobe in the western compartment is barrel-vaulted, cleverly changing direction over the garderobe itself, which lies at an angle to the intramural passage. This

change of direction seems to match the point where the chamber has been built into the angle between the diagonal corner buttress and the main external face of the wall. Traces of gudgeon pins still exist in the eastern jamb of the door to the passage, and both jambs are rebated internally, demonstrating that the door opened inwards. The surround of the porthole light over the garderobe was constructed from a single block of red sandstone. Another small single light window in the south wall, with an extremely wide internal splay in all directions, lit the passage. The garderobe chute appeared to be squared internally, and set vertically, so that effluent would drop directly to the ground below, with no effort to throw it away from the walls.

Intramural stairs are situated at opposite corners of the western and central keep compartments: at the north-western corner of the western compartment and the south-eastern corner of the central compartment, at the junction between this and the south-eastern tower. Both are now largely decayed, but it is clear that both were intended originally to connect with the parapet walk. That to the south-east corner probably did so during the use of the castle, only being sealed during the nineteenth-century restoration, but that in the western compartment seems to have undergone a change of design during construction, since the present ceiling is finely rib-vaulted. The newel post had also once been finely worked.

Perhaps unusually, this stair gives access from the basement to the second floor, but not to the first floor, which, judging from its features, was probably used for domestic accommodation. Similarly, the south-eastern stairs give access only between the south-eastern tower and the second floor of the compartment. These arrangements would tend to imply both different functions for different parts of the building, and perhaps also some extra defensive qualities. In contradiction, however, all doorways on both stairs are clearly rebated for the doors to open inwards, into the stairwell. This perhaps indicates that defence was not the only concern in the planning of the keep.

The stairs in the south-eastern corner of the central compartment were the broadest in the structure, probably suggesting that the main domestic accommodation occupied the upper parts of the south-eastern tower, and perhaps also the eastern keep compartment. These stairs continued into the turret at their head and, in the same manner as those repaired by Buccleuch to the east of the gatehouse, scars of further stairs can be seen continuing around the walls of the turret. This may suggest either a change in design or that the stairs once led to a lookout post on the roof of this turret, which has subsequently been demolished, either during the life of the castle or in the Buccleuch restoration, which is known to have heavily restored this feature.

The keep was clearly roofed in two spans, with the central and western compartments being contained under one span and the eastern compartment under another. The scar of the eastern part of the western roof is still visible within the north wall of the central compartment. This means that the wall between the central and eastern compartments had a vital load-bearing role, although it does not appear to have been constructed in a more substantial fashion than that between the western and central keep compartments.

Fallen Masonry

Piel Island has clearly suffered from coastal erosion, certainly during the last two hundred years. Thomas Hearne's painting of 1781 (reproduced in Curwen 1910) shows the northern part of the keep intact, although obviously in danger of collapse, with active erosion undercutting its eastern wall. Large fragments of what appears to be the inner north-eastern tower lie in the foreground of the picture and a substantial part of the south-eastern keep tower can be seen to have fallen beyond the surviving keep. The extent of the island during the active life of the castle cannot now be established, although it is certain that the castle never was concentric in plan, as it might at first glance be supposed. The southern outer curtain wall clearly once joined the inner south-western tower, and the alignment of the outer and inner north-eastern towers suggests that the outer eastern wall also once joined the two. No evidence now remains for any curtain wall around the southern and eastern sides of the keep and any former presence is uncertain; this south-eastern angle of the island seems to have been the point of greatest active erosion, and it is here that the most permanent sea defences had to be constructed.

The remains of collapsed elements of the castle are today visible along the southern and eastern shores of the island, from a short distance to the east of the outer south-western tower, to a little to the north of the outer north-eastern tower. Two particular concentrations exist, however, where recognisable fragments can be discerned: between the outer and inner south-western towers, and to the east of the

PLATE. 1. Fallen masonry from the eastern wall of the keep lying on the beach, during the repairs of the coastal protection around the south-east sides of the island.

keep. In other areas, the masonry is too fragmentary to be interpreted, although logic would suggest that it forms the remains of collapsed elements of the inner (where there is a slight grouping) and outer north-eastern towers.

The position and the pattern of collapse of the southernmost concentration make it quite obvious that these fragments are elements of the southern curtain wall. They now lie as a relatively straight alignment, parallel to the water edge, and there is a particular grouping towards the inner south-western tower. None contain any particular architectural details, being constructed in rough courses of mixed geology beach stones although with a high incidence of granite, the internal and external faces being chipped to form a relatively smooth surface. The amount of vegetation covering most faces disguises any traces of galleting. In a few places, evidence of building lifts exist, where a thin but continuous skim of mortar is visible between courses, and the wall was clearly set on a stepped and apparently coursed foundation, the uppermost level of which tends to adhere to the surviving fragments. Stones forming the foundations are usually larger than those forming the faces. The core comprises generally smaller unworked beach stones, set apparently randomly into a shelly lime mortar.

This part of the island is particularly low-lying, the present turf standing only some 2 m above the beach. The position of the fragments indicates that the wall has been undercut, presumably by storm tides, and that it has simply keeled over in a block, probably breaking into fragments as it fell; the external elevation is almost always face downwards on the beach and the traces of foundations are closest to the land. The result is that the upper elements of the wall have been most subject to erosion, and no trace of parapet or wall walk now survives.

The concentration to the east of the keep is much more jumbled, but nevertheless elements can be recognised. One large fragment of masonry lies against the cliff edge and other substantial fragments are situated at the base of the cliff, particularly to its south; smaller elements surround this concentration, scattered further out onto the beach. In places, fragments have been utilised as part of the sea defences. The majority of this concentration is part of the east wall of the keep, although the orientation of a large fragment at the northern extent, at an approximate right-angle to the others, suggested that this formed part of the northern wall of the keep; subsequently, analysis of the fabric confirmed this supposition.

The fragments from the keep differ markedly from those of the curtain wall, as one would expect from analysis of the standing masonry. The basic construction is similar, however, being of mixed cobbles from the beach, those forming the elevations roughly worked to produce a relatively smooth face. The lesser amount of vegetation on many of the fragments allowed identification of large quantities of galleting, mostly chips of beach stones, presumably created by the working of the facing stones. This type of arrangement is to be expected where irregularly shaped stones are used in wall construction. The core again comprises unworked beach stones, set randomly in shelly mortar, generally somewhat smaller than those forming the faces, although perhaps less so than in the curtain wall to the south-west. Occasional large stones may have been deliberately placed to give the core some body. The foundations were also stepped, again formed by roughly coursed beach stones, although here they did not appear to be significantly different in size from those forming the superstructure.

The main difference between these fragments and those of the curtain wall is created by the use of red sandstone ashlar to highlight architectural detail. The application of sandstone is more than decorative, however, as the construction technique of using rounded unworked stones creates problems of stability and finishing at corners, and around openings; using a more easily worked stone in these areas eradicated the structural problems, and also created a stylish design.

The presence of red sandstone ashlar in the fallen masonry allowed the identification of a number of architectural details and also the partial reconstruction of parts of the north-eastern corner of the keep and a length of the eastern wall. In all, six window embrasures were recorded, the majority seen to be narrow ground-floor lights, deeply splayed internally. Two of the larger, first-floor, windows were also identified, again demonstrating the red sandstone-lined embrasure seen elsewhere in the standing elements of the keep. In addition, elements of a hearth were identified, immediately to the north of one of the first floor windows. It had a base of red sandstone laid in a herringbone pattern; the intramural flue was also visible. The scar of a central buttress, matching that on the west wall of the keep, could be identified to the south of this hearth and window.

Elements of the red sandstone plinth on which the keep was constructed marked the base of the wall in the better preserved sections. Evidence of three joist holes, denoting the first floor level, was also identified, again on the fragment containing the hearth. Several open putlock holes could also be seen forming a regular pattern on the better preserved sections. In places slight evidence for building lifts could be discerned.

The information recovered from the disposition of the fragments supported the evidence of the Hearne painting of 1781. Coastal erosion had undermined the foundations of the north-eastern corner of the keep, causing it to collapse, bringing down part of the east wall as it did so. As suggested for the curtain wall, the evidence indicates that the wall slipped and turned as it fell, so that the upper parts lay furthest from the cliff, and have been subject to most erosion. Whilst elements of both the ground and first floor of the north-eastern part of the keep have been recognised, little of the second floor could be identified. The comparative lack of survival of the collapsed sections of the south-eastern tower block of the keep amongst the fallen masonry confirms the detail of the Hearne painting, that this element was the first part of the eastern side of the keep to fall, and its remains have therefore had longer to be broken up by the tide. This is only to be expected as this element stood at the south-eastern point of the island, exposed to the full erosive power of the tidal surge sweeping in to the harbour. In general, fragments seem to have broken at points of weakness, particularly through windows.

The orientation of some of the fragments and the architectural detail visible on them allowed partial reconstruction, in particular of the north-eastern corner of the keep (Fig. 3). Here the standing structure confirms that the wall sheared at the main point of weakness, where windows on all three floors lie one above the other. This fact made reconstruction simpler, as the two halves of the fractured windows could be matched relatively easily. The entire corner fragment remains intact, with sufficient information relating to the northern end of the eastern wall to allow other sections, lying next to it on the beach, to be matched to it.

The reconstructed section (Fig. 4) clearly showed that accommodation on the

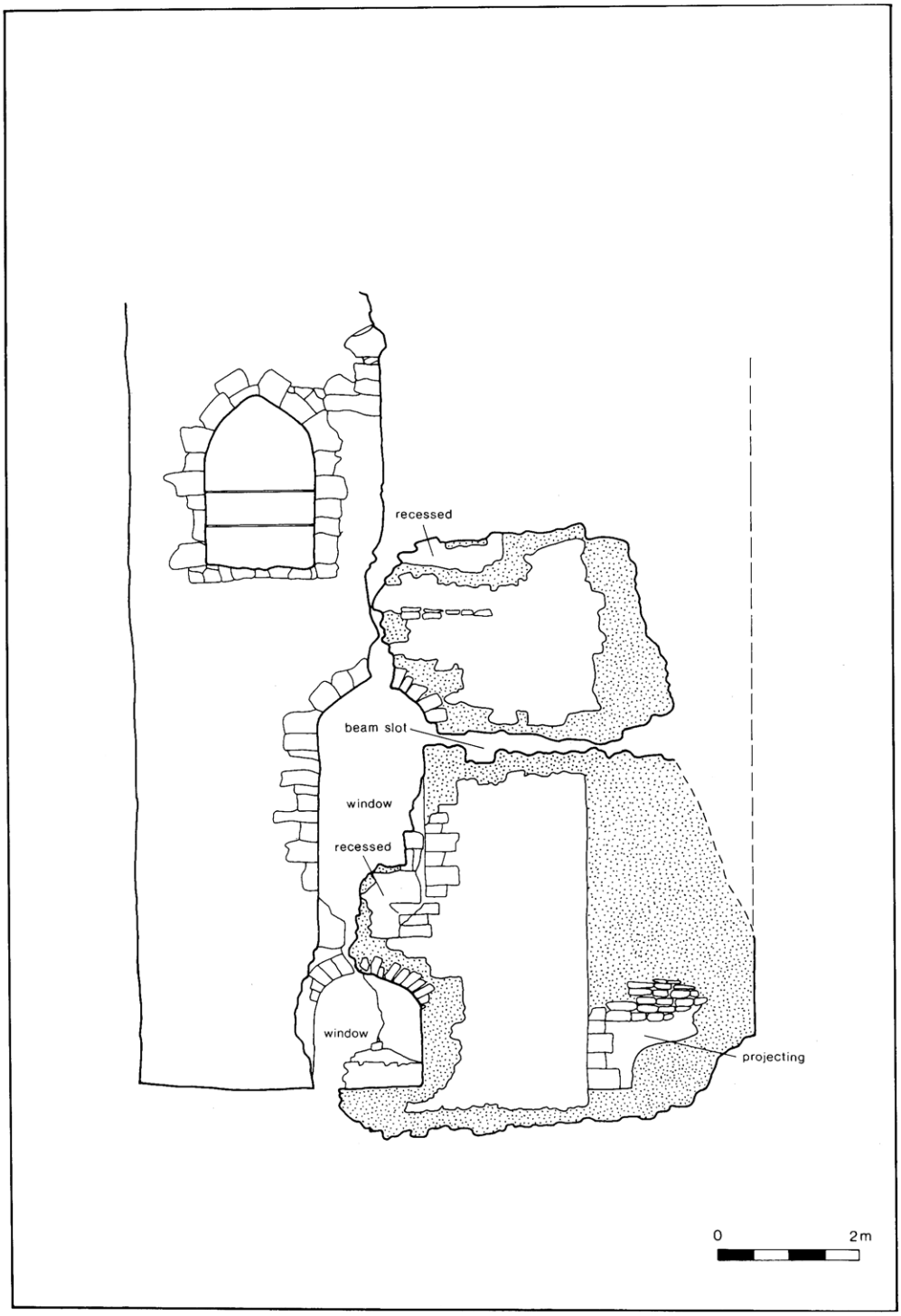

FIG. 3. Partial reconstruction of the north wall of the keep (internal).

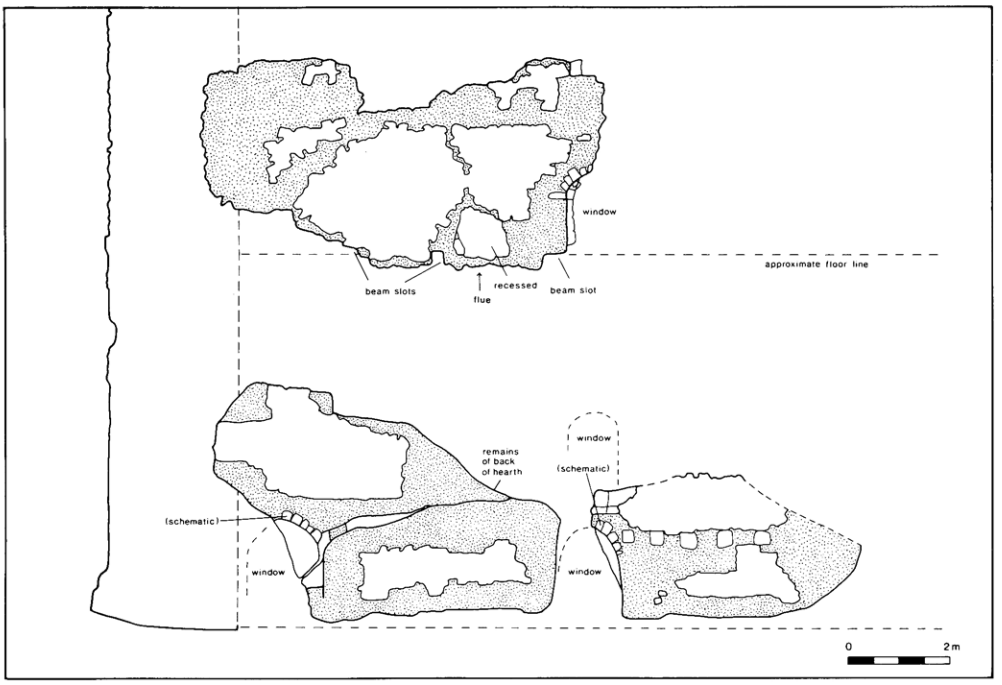

FIG. 4. Partial reconstruction of the east wall of the keep (internal).

first floor here was relatively similar to that in the western keep compartment, with a fireplace with intramural flue set into an external wall, suggesting some potentially domestic use. Little evidence remains of the first floor windows, but the standing fabric demonstrates that at least the northern light was blocked prior to the collapse of the east wall; again the blocking of first-floor windows was a feature of the western keep compartment. This clearly indicates a change in use, perhaps a move from the castle being a place of retreat for the Abbot of Furness, to a more prosaic activity, the structure perhaps acting as a warehouse and/or customs post. The narrow lights of the ground floor again demonstrate the need for some defence, and the fact that this floor did not supply accommodation.

The Latest Work

The 1994 consolidation work by English Heritage's own workforce (Historic Properties Restoration) has allowed a cursory examination of elements of the outer bailey. Clearance of vegetation has revealed that the foundations of the north curtain wall are off-set, with the same design as those of the outer south curtain wall, visible in the fallen masonry. In addition, the sections of curtain wall which survive only as foundations, to the east and south of the outer north-west tower, are clearly much narrower than the standing sections. This must bring their contemporaneity into question, although the Buck print (printed by Curwen 1910) indicates that walls

were present in the mid-eighteenth century. Further clearance of vegetation at the base of the east wall of the outer north-west tower, which has been constructed over upcast from the moat, has revealed a well-laid section of pitched footings of red sandstone in the centre of the wall. The purpose of these is presently obscure.

Discussion

The programme of consolidation and repair allowed an intimate examination of much of the fabric of the monument over a period of five years. This was beneficial on two counts: firstly, in that the scaffolding of elevations permitted the fabric to be viewed close to, so that subtle changes, not readily visible from the ground, could be recorded, and secondly, the long period over which visits were spread encouraged a deeper knowledge of the castle, facilitating regular reassessment of hypotheses in the light of new evidence. On both counts, the monitoring of the consolidation was of great benefit and produced a more rounded view of the monument than would have been gained from a rapid survey, even though this examination did not change substantively the broad conclusions reached after the initial fabric survey.

The extent of the restoration undertaken under the auspices of the Duke of Buccleuch, and the quality of that work, became more readily apparent, particularly as familiarity with erosion patterns demonstrated that a relatively large amount of the badly damaged red sandstone on the south side of the keep was in fact nineteenth-century in origin, and again in need of repair. It is clear also that the policy during the recent programme of consolidation and repair matched that of Buccleuch's relatively closely, although more weight was given to rebuilding collapsed elements in the earlier campaign, particularly in the turrets at the top of the keep. The rebuilding of a limited number of access routes was also part of this earlier work, presumably to aid the restoration of other elements and to allow visitors to enjoy the upper parts of the monument. The modern consolidation programme took account of the practicalities of allowing free access to a monument without custodial care, particularly in terms of health and safety responsibilities, and therefore one significant element was to prevent unauthorised entry to those parts where significant injury might result. This work concentrated on the keep and led to the fitting of a gate at the base of the stairs in the north wall, one of Buccleuch's renovations, and to the rebuilding of the collapsed external face of the stairwell in the west wall.

The archives held by English Heritage contain plans of proposed renovations drawn up in the 1920s, shortly after the monument was taken into the guardianship of the Ministry of Works. These never seem to have been put into effect, but there was evidence within the fabric for minor consolidation, particularly to wall tops, which did not seem to belong to the Buccleuch restoration. This apparently *ad hoc* consolidation had tended to cap wall tops with concrete bands, a policy that was reversed in the modern programme, where a decision was made to rely on good repointing of the existing masonry, rather than the application of alien substances, as a more sympathetic manner of stabilising the fabric and preventing further decay.

Despite the level of detailed information collated for the castle, its central enigma still remains. The keep demonstrates a number of features which would militate

against a belief that the primary purpose of the monument was defence. In particular, despite the defensive layout of the whole, the large windows at first floor level in the keep would make attack easy if the outer defences were breached. It is notable that these windows were obviously blocked in antiquity. It may be suggested that the castle, as originally conceived, was designed as a retreat for the Abbot, with an emphasis on domestic comforts, such as light and heat, and that it was subsequently converted to a more utilitarian purpose, probably as a customs post, controlling the important safe harbour of Barrow. It is notable that a government report of 1588 (Lansdowne MSS, cod 56, No. 51, quoted in Curwen 1910, 277) referred to Barrow Harbour as the only good haven for great ships between Milford Haven and Carlisle.

The question remains, however, whether the so-called Abbot's house was constructed as a direct result of the Scottish raid of 1322, when Robert the Bruce himself led an army to Furness, with the 1327 licence to crenellate simply regularising the situation, or whether this event acted as a catalyst to convert an existing building to a state of greater defence. It is possible that the keep originally stood alone as a tower house, and the licence of 1327 relates to the creation of the double defence of curtain walls around it. This suggestion may be supported by the fact that the licence grants to the Abbot and convent the crenellation of "[their] dwelling-house of Fotheray" (*Cal. Pat. Rolls 1327-1330*, 169), from which it can be inferred that a building was already extant on the site, but a free-standing tower without other defences at a period much before the 1327 licence would be unusual. There is a persistent tradition that fortifications existed on Piel from the mid-twelfth century, as a result of an instruction from King Stephen (Beck 1844, 281) but this has not been substantiated either archaeologically or architecturally.

On balance, it seems most likely that the standing structure dates from the first quarter of the fourteenth century as an entity and that the licence regularised an existing situation. There clearly were some changes in plan, such as the construction of the inner north-western tower (Newman 1987, 106), the addition of central buttresses on the keep (Newman *op. cit.* 110), and the change in level of the entrance to the keep (Newman *op. cit.* 109), but these seem to have occurred either during construction, or very shortly after, and only the latter may be seen as substantially altering the way the monument was conceived. The blocking of the first floor windows of the keep has been associated with repairs likely to have resulted from the dispute early in the reign of Henry IV, around 1403 (Newman *op. cit.* 110).

Despite close inspection, there is no evidence in the fabric to indicate the position of a kitchen. It is possible that this was contained in the south-eastern keep tower, now largely collapsed, or in the eastern keep compartment, but the surviving masonry gives no evidence of this. It is also possible that the kitchen stood as a separate structure, presumably within the Inner Bailey, but again, no trace has been recovered, and the practicality of moving warm food from a separate structure into the keep may militate against this theory. A chapel may also have existed in that part of the keep which has collapsed; the problems with the dating of the so-called chapel in the outer bailey have been discussed elsewhere (Newman *op. cit.* 110). Similarly, no evidence has been recovered that would indicate the position of a well to serve the castle, although it may be presumed that one once existed in the Inner Bailey. The seepage of salt from the sea into the fresh water supply may always have caused problems.

Conclusions

The archaeological excavations, fabric survey, and monitoring from 1983 onwards were driven by a need to consolidate and repair Piel Castle, so that it would survive in a relatively stable state into the twenty-first century. However, the amount of information, both positive and negative, that has been collected in the course of this programme has demonstrated the potential wealth that may be generated by a thorough examination of a structure, even when it does not have a large body of documentary material relating to it. The integration of archeological work with the consolidation of fabric has now become a firmly accepted policy for historic properties, both in the guardianship of English Heritage and in private ownership.

Although the history of the castle remains fragmentary and obscure, and potentially vital elements (such as the most likely position of the gateway to the outer bailey and the eastern side of the keep) have been destroyed by the erosion of the island, nevertheless a full picture of the complexity of the site has been formed, supplemented by intimate details concerning the expectations and comforts of its inhabitants. Piel Castle was clearly designed not solely as a refuge, even though it was most likely constructed as a result of the fear of invasion by the Scots, but as a monument to impress, and perhaps also to intimidate, those who entered Barrow Harbour. The success of this design, even in its present ruinous state, is still evident today as the monument remains one of the dominant elements of Morecambe Bay.

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The archive, comprising annotated drawings, field notes and excavation report, and the few finds from the excavations, is to be curated by English Heritage Historic Properties (North).

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